

Effect of plastic content ratio on the mechanical properties of Wood-Plastic Composite (WPC) made from three different recycled plastic and acacia fibres

ABSTRACT

Recycled plastic as a matrix in Wood Plastic Composite (WPC) has been one of the major interesting research subjects due to its availability and for the sake of environmental concern. In this study, the effect of different ratios (100%, 90%, 80%, 70%, 60% and 50%) of plastic content from polypropylene (PP), high density polyethylene (HDPE) and low density polyethylene (LDPE) mixed with wood fibres (WF) from Acacia were used to produce WPCs and evaluated for their mechanical properties. The composite test pieces were produced by hot-press method and mould which followed ASTM D638 -02 and ASTM D790-02 for tensile properties and flexural properties respectively. It was found that the performance of tensile strength was linearly increased with increasing amount of plastic content. WPCs of PP-WF, HDPE-WF and LDPE-WF having 100% plastic content showed highest tensile strength which were 25.02 N/mm², 16.41 N/mm² and 12.45 N/mm² respectively for different recycled plastic. Modulus of Elasticity (MOE) and Modulus of Rupture (MOR) results showed that WPC with 100% PP had the highest with 1020.07 N/mm² for MOE followed by 417.30 N/mm² and 371.81 N/mm² respectively for 100% HDPE and 100% LDPE. MOR showed highest for 100% PP also with 25.10 N/mm² as compared to HDPE only achieved 12.54 N/mm² and LDPE with 10.66 N/mm².